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INDO-PACIFIC FISHERIES COUNCIL
FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS
BANGKOK THAILAND

Ninth Pacific Science Congress

THE Ninth Pacific Science Congress of the Pacific Science Association will take place in Bangkok from 18 November to 9 December 1957. It is being held under the auspices of His Majesty's Government of Thailand and the Science Society of Thailand.

In a *Preliminary Announcement*, the Pacific Science Association has drafted an *Outline Program* which is subject to revision and the final program topics will appear in later *Circulars of Information*. The draft program includes:

Oceanography:

a. Marine Upwelling: 1) The Physical and Chemical Aspects,
   2) The Biological Aspects.

b. Oceanography and Marine Resources of the Gulf of Thailand and Adjacent Areas: 1) General Physical Oceanography,
   2) General Biological Oceanography.

c. Radioactive Wastes in the Sea.

d. EQUAPAC.

e. Oceanic Productivity.

Fisheries:

a. Improvement and Management of Natural Inland Waters and Impounded Waters.

b. Newest Developments in Pond Culture with Special Reference to Species Important to the Rural Economy.

c. Marine Upwelling, Biological Aspects (with Oceanography).

d. Oceanography and Marine Resources of the Gulf of Thailand and Adjacent Areas (with Oceanography).

e. Oceanic Productivity (with Oceanography).

Zoology:

a. Inventory of the Systematic and General Ecology of the Fauna of Thailand.

b. Present Status of our Scientific Knowledge of Rodent Pests in the Pacific Area with Special Reference to the Rat.

c. Ecology and Pacific Distribution of the Giant African Snail (*Achatina fulica*) with Special Reference to Measures that are being taken for its Control.

A number of the symposia and discussions will concern more than one division of the Congress. With the assistance of UNESCO, a special symposium on *Humid Tropics Research* will be organized. The Organizing Committee also plans a special meeting to discuss the Scientific Work of International Agencies in the Pacific Countries.

THE ROLE OF THE FISHERMAN IN SOCIETY

W.H. Cummings
Regional Representative of the Director-General of FAO
for Asia and the Far East

The broad task facing the Food and Agriculture Organization (FAO) in its second decade of existence is to bring more of the fruits of the soil, more of the fish from the sea, the lakes and the rivers, to the people of the world – and at prices which they can pay. In addition, we must stress better nutritional standards among all peoples. We need to increase the efficiency of farming, forestry and fisheries, and through all these means, widen the opportunity of all people for productive work.

It is particularly gratifying to note that during the last ten years the social status of the farmer has risen steadily, although it is not, as yet, at a satisfactory level throughout the world. This improved status in turn has increased his political and economic importance.

The same situation does not apply to the fisherman. With rare exceptions his social, economic or political status has not improved to any great degree in any part of the world. In large measure, the low social status of the fisherman has retarded the growth and development of the fishing industry, not only in the Indo-Pacific region but many other areas.

It is unfortunate but true that the fisherman continues to live a precarious existence. His life is an arduous one and his profession is such that he cannot limit his activities on the basis of an eight hour day. He is dependent upon the vagaries of wind and water, tides and currents and the peculiarities of the behaviour of the commodity that he seeks. The skilled professional fisherman achieves his special ability only after a long period of training which restricts development in other spheres. Hence, by the very nature of his calling the fisherman cannot expect to achieve cultural and intellectual levels more readily accessible to certain other groups.

It should be remembered that the fisherman, no less than the farmer, particularly in Southeast Asia, contributes to the well-being of the people of the area. He brings to them their main source of animal protein taken in either fresh, dried or in processed form without which even a substandard nutritional level could not be maintained.

Generally, governments at the administrative level are beginning to recognize the importance of the fishing industries. As yet, however, the importance of the fisherman himself, upon which a successful and productive fishing industry must depend, has not been fully appreciated.

During the postwar years, various experiments and theories have been tried and advanced to increase fish production. Little attention has been given, however, to the question of the economic status of the fisherman or to ensuring him an adequate return for his time and labour. He is unable on his own to learn the intricacies of business management. More often than not he falls an easy prey to unscrupulous merchants or financiers. Moreover, he has no control over transport, seriously restricted in this area, which would permit him to seek markets further afield and thus reduce his dependence on facilities to the fishing ports themselves. In many cases he does not know his rights under the law.

These factors, plus the current systems of financial control of the industry which are antequated in character, tend to depress the social and economic level of the fisherman. In addition, his lack of education, the root cause of his low social status, has made it easy for other elements in the industry to obtain a monopoly in the handling and marketing of his fish once they are caught.

It is the hope of FAO that in programs of fisheries development, governments will keep in mind the human element and incorporate in their plans measures which will tend to make "the fisherman's lot a happier one".

General

I.R.C. Recommendations on Paddy-cum-Fish Culture

The International Rice Commission at its 5th Session held in Calcutta, India, 12-19 November 1956 recommended that governments should ensure a close liaison between national departments concerned with rice and fish culture, thus making possible adequate studies of both the technical and economic aspects of fish culture in rice fields; and where fisheries departments do not have facilities for this work, the departments concerned with rice production should collect data on the yields of fish obtained from rice fields stocked under natural and artificial conditions. It was further recommended that the Secretariats of the International Rice Commission and the Indo Pacific Fisheries Council should maintain close liaison in the development of this work and in the assembling and dissemination of results; and that FAO should seek the assistance of the General Fisheries Council for the Mediterranean in gathering information which would contribute to the solution of this problem.

Insecticides and Paddy-cum-Fish Culture

A major obstacle in the use of insecticides for borer control in paddy fields is presented by the high toxicity of almost all insecticides to fish which may be growing in the paddy fields under the natural or artificial conditions. The Department of Agriculture, Malaya undertook experiments to determine the toxicity of the various insecticides to fish. The lethal concentrations for 20 hours of continuous exposure for young *Ophicephalus striatus* were found to be:

Endrin (as 19.5 per cent emulsifiable concentrate) 0.00045 p.p.m., Dieldrin (as Dieldrex-15, 15 per cent) 0.0079 p.p.m., DDT (as 25 per cent emulsifiable concentrate) 0.040 p.p.m., Gamma-BHC (as Gammalin liquid, 10 per cent Gamma) 0.7 p.p.m., and Gamma-BHC (as Agrocide wettable powder, 6.5 per cent Gamma) 0.32 p.p.m.

The above results confirmed those obtained in 1954 that Endrin and Dieldrin are too toxic for use at the normal rate of application (½-1 pound per acre), although Dieldrin may be safe when the paddy is dense and little spray reaches the water. DDT and Gamma-BHC would normally be safe to use. Endrin was found, from tests in Selangor, to be highly toxic to ducks as well as to fish.

The solvent oil appears to be a contributing factor in the toxicity of insecticides, while an unknown constituent of Agrocide wettable powder seems to have an antidote effect both for Gamma-BHC and Dieldrin.

Radioactive Byproducts for Preservation of Fish

The use of radioactive byproducts from atomic reactors for improving the keeping quality of fish was envisaged by Dr. I. Voyvodic of Oakville, Ont., Canada. Dr Voyvodic described experiments in food preservation using varying amounts of radiation. A large amount produced sterilization and indefinite storage; a small radiation extended the shelf life and kept food fresh for 10 to 20 times as long.

An important feature of the tests was that no evidence was found that gamma irradiated foods contained either toxic agents or any induced radioactivity.

Because of the extreme perishability of fish, radio-pasteurization of this commodity was of great interest to the commercial

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fishing industry. Present estimates suggest that the cost of this treatment should be quite low, about a tenth of a U.S. cent per pound if carried out on a large scale at the processing plants and if large quantities of fission byproducts were available from nuclear reactors.

Sodium Bisulfite to Control "Black Spot" on Shrimp

Reserch at the Marine Laboratory, University of Miami. Florida, U.S.A., has shown that shrimp dipped in a dilute solution of sodium bisulfite, developed much less black spot than untreated shrimp. The U.S. Food and Drug Administration has approved the commercial application of the technique. Shrimp processed in this manner, however, must be labelled accordingly.

Baskets of headed and thoroughly cleaned shrimp are dipped in wooden tanks of 1 ¼ per cent solution of sodium bisulfite and agitated in the solution for one minute. The baskets are then lifted, drained and the shrimp iced in the usual way. Concentrations of sodium bisulfite higher than 1 ¼ per cent may discolour the shrimp; dipped for longer than one minute will also have similar effects; metal tanks can not be used as sodium bisulfite corrodes metal. The solution should be fresh and after each day's fishing dumped overboard and the dip tank cleaned and flushed out. The sodium bisulfite solution should be kept as cool as possible in order to keep bacteria under control. To ensure uniform effects of sodium bisulfite the basket of shrimp should never be allowed to sit in the tanks but must be agitated in the solution for the one minute period.

Fish Sauces Prove Popular in Africa

Following a request from FAO, the Food and Nutrition Section of the Research Institute of the French Cameroons studied the acceptability of fish paste and sauce by the Africans. The results of this study were described by Masseyeff, Cambon and Bergeret in the April 1955 issue of *Encyclopedie Mensuelle d'Outre-Mer*.

The products, more concentrated than nuoc-man of Indo-China or nam-pla of Thailand, were prepared in France by the fermenation of surplus whole fish or fish guts.

The trials were conducted in municipalities as well as in villages. The paste or sauce was added to the usual African meals which consisted of a plate of rice flavoured with a sauce containing meat, peanuts, tomatoes, pimento and palm oil. The proportion of the sauce added was from 6-9 grams per plate. The trial lasted three days, and 88 per cent of the people who tried the sauce or paste approved this addition to their diets.

Fish flour for Human Consumption

In cooperation with UNICEF and FAO, the Government of Burma are currently sponsoring trials for the introduction of fish flour as a protein supplement in human diet. World attention was centred around fish flour as a possible protein supplement in human diet primarily due to the realization of protein malnutrition in infants or young children in many countries of the world, notably India, China, Africa, Indonesia, Thailand, Philippines and some of the Latin American countries. The edible fish flour containing up to 75-80 per cent protein of high biological value as well as high levels of calcium, phosphorus, iron and vitamin B_{12}, offers special advantages in view of the low price of the commodity. The price for fish flour ranging between 10-25 cents (US) per kg. compares favourably with the normal prices for the common cheap sources of animal protein and brings it within the reach of the common man.

The first UNICEF/FAO sponsored trials with fish flour for human consumption in Chile proved successful enough to prompt the Government of that country to

seek FAO help for building a fish flour plant. Similar trials have been conducted in India, South Africa, Malaya, Indonesia and Thailand with varying degrees of success. In some of the countries the fish flour with its normal odour and texture was acceptable while in other countries there were indications that an odourless fish flour of a very fine texture will find acceptance.

The trials in Burma are at present being conducted on a total of 134 children belonging to two nurseries. Each child daily receives 20 gm. of fish flour incorporated in a composite balanced diet. The composition of the diet is changed to achieve gradual elimination of skim milk powder by fish flour and gradual decrease in the intake of animal protein food other than fish flour.

The effects of this fish flour supplement in the diet are followed by noting the incidence among the children of xerophthalmia, angular stomatitis, caries, anaemia, and rickets, as well as by weight gained, and the general state of health of the children. The results so far, although indicative of success, are not conclusive and the study is being continued.

Versatile Fishing Vessel

"*Sleep Robber*" built by Messrs. Star Shipyard (Mercers) Limited, New Westminster, B.C., Canada combines seining, longlining and trawling.

The vessel is 72 feet in length, with a beam of 20 feet, powered by a diesel engine of 360 BHP, has a cruising speed of 10 knots and is capable of a 12-knot speed when necessary.

The hull is mostly timber, oak frames and British Columbia fir. Plywood was used for the housing, decks are of fibre glass, as also are the two life boats. Bulk-heads, mast and boom are of steel.

In the galley are an oil stove and a gas range, with a deep freezer and a refrigerator for the crew's food supplies. The men's berths are equipped with wash basins of stainless steel and there is a shower for general use.

The usual seine table is absent, being supplanted by a power block suspended from the boom which takes over the work of hauling in the seine net.

The main winch, partly hydraulic and partly mechanical, operates seines, longlines and the trawl net.

The fishhold is refrigerated by a brine freezing system. The maximum carrying capacity is estimated at 150 tons of herring or lesser quantities of salmon, halibut or trawl fish.

Navigation equipment includes two radio-phones, a radar, a direction finder and a combination echo-sounder. The latter gives readings for 350 fathoms on slow scale and 65 fathoms on fast scale for herring, and has an indicating sounder for night running.

An intercom P.A. system will reach members of the crew in any part of the vessel. Two television receivers, one in the captain's room and one in the crew's quarters, are among the luxury items. The estimated cost of building and equipping the vessel is US $ 150,000.

Sea Scanar to Study Tuna

U.S. Fish and Wildlife Service Scientists on the research vessel *Charles H. Gilbert* are studying the occurance and movements of skipjack and large tuna in Hawaiian waters with the aid of Sea Scanar.

The Scientists have been testing the device on both natural and artificial targets. Under favourable conditions, metal targets suspended under water were detected 2,000 feet from the ship. A suspended dead skipjack was detected at a range of 1,000 feet, as also was a much smaller herring whose well-developed air-bladder acts as a

resonating chamber, producing strong echoes.

The Sea Scanar which holds promise of being a very useful tool not only for detecting schools of fish but also for indicating the exact magnitudes of such schools, is a combination of Asdic and echo-sounder which can sweep the sea ahead of a ship horizontally, at any desired angle or can also be used vertically beneath a ship like an echo-sounder.

UNESCO Training Course

The Southeast Asia Science Cooperation Office of UNESCO recently organized a Training Course in Marine Taxonomy and Planktonology. The Training Course was under the sponsorship of the Ministry of Education of Vietnam and was conducted at the Institut Oceanographique de Nha-Trang.

Participants from Indonesia, Malaya, Philippines, Singapore, Taiwan, Thailand and Vietnam attended the course, which lasted from 11 February to 9 March 1957. Dr. J.D.F. Hardenberg, formerly of the Sea Fishery Laboratory, Djakarta, was Director of the section on Marine Taxonomy and Dr. Shigeru Motada of the University of Hokkaido directed the study in planktonology.

International Conference on Law of the Sea

The Legal Committee of the United Nations General Assembly recommended early in January 1957 that a plenipotentiary international conference to draw up one or more instruments on the law of the sea be held in Rome, early in March 1958.

In recommending the convening of the conference, the Committee endorsed a proposal made by the UN International Law Commission in its comprehensive report embodying some seven years' work on the law of the sea. The Committee's vote concluded a debate on the report which has extended over the past three weeks. (See *Curr. Affrs. Bull., No. 17, p. 2*).

In its final form, the resolution provides that the conference, which would be based on the Commission's report, should take account not only of the legal aspects of the law of the sea, "but also of the technical, biological, economic and political aspects of the problem".

Oceanography Courses in Hawaii University

The University of Hawaii has inaugurated a series of courses in oceanography this semester. Distinguished visiting professors include Dr. Hans Pettersson of Sweden and Dr. Norris Rakestraw of Scripps Institution of Oceanography. In addition, fisheries courses are being offered by Dr. Maurice Blackburn, formerly of CSIRO, Australia, who joined the University of Hawaii faculty in September 1956.

News from Member Governments

AUSTRALIA

Commonwealth of Australia

Fish Production Falls

Fish production in Australia during 1955-56 fell by 5.4 milllon pounds (8.1 per cent) compared with the previous year. Fish production had fallen by 13.6 million pounds (18.1 per cent) to 61.4 million

pounds between 1953 and 1956. During this period fish produced in New South Wales alone had dropped by 8.8 million pounds. This fall in production is related mainly to the decrease in the number of steam trawlers operating. There are now only four continuously engaged in the south-eastern trawl fishery compared with a maximum of 12 in recent years. Adverse weather conditions during the year played a big role. Prolonged general rains along the entire eastern coast caused heavy flooding of rivers and streams severely disturbing fish stocks and oyster beds, and generally reducing the number of actual fishing days.

4.3 Million Dollars from Crays

During 1955-56 crayfish earned 4.3 million US dollars for Australia. This is about $100,000 more than in 1954-55. This earning was possible, despite a fall in Australian production of crays, due to a steep price rise for cray in U.S.A. The total value of crayfish exported was A £ 1,879,000. The fall in production was associated in varying degrees in different areas with adverse weather conditions poor runs of "white" crayfish, and invasion by octopus.

South Africa has re-taken the lead from Australia in the quantity of crayfish tails exported to U.S.A. from Southern Hemisphere countries.

Cultured Pearl Farm

Under a joint Japanese, Australian, and United States cultured pearl farm program, a Japanese pearling lugger recently arrived at Broome, Western Australia. The lugger carried 15 Japanese specialists who began the culture of pearls in a four-square-mile area in Brecknock Harbor, between Augustus Island and the mainland some 200 miles north of Broome.

The Nippon Pearl Company of Tokyo made an agreement with an Australian company, Pearls, Pty. Ltd., whereby the former is to supply specialists and about half the funds required and the latter is to be responsible for all arrangements in Australia.

The arrangements were approved by the Commonwealth and the State Governments, and the Australian company received a three-year license for the pearl farm area. It was reported that some 35,000 immature oysters would be planted in the first year and that the bulk of the artificial pearls produced would be marketed in the United States.

Cooperative Profit of A £ 40,158

South Australian Fishermen's cooperative Ltd. announced at the end of 1955-56 that it had available for distribution to share-holders a profit of A £ 40,158.

Cooperative sales increased from £ 651,341 in 1954-55 to £ 690,604 of which £ 300,000 was export sales. Fish purchases totaled 4,807,780 pounds (up 170,481 pounds). Total value of purchases was £ 501,449 which was equal to a return to members of 72.6 per cent of total sales.

With £ 10,013 added to it during the year, Depreciation Reserves now stand at £ 29,387. Share capital totals £ 55,569. Assets rose by £55,606 to £300,145. They have increased thirtyfold in eight years.

Capital expenditure of £46,000 was incurred during the year in improving services and facilities.

The Cooperative recently purchased a cannery which is being managed by a Greek processing expert. The Committee has in mind the production of continental delicacies to cater for an existing demand.

Cooperative Formed to Finance Fishermen's Federation

The Australian Professional Fishermen's Federation recently decided to estab-

lish the Australian Professional Fishermen's Cooperative to supply fishermen with gear as a means of financing the Federation and assissting its State branches.

Seven fishermen's organizations agreed to become the foundation members of the Cooperative which will be registered in Canberra as soon as possible and a committee of management of three was appointed. An offer from the N.S.W. United Fishermen's League of the services of its secretary as honorary secretary of the Federation was accepted.

Loan to Cooperative for Truck

The N.S.W. Government approved a loan from the Fish Marketing Fund for an insulated refrigerated truck for Evans Head Fishermen's Cooperative.

The truck will provide improved transport to the market for fish landed by operators at outlying ports. The Cooperative will be assured of receiving fish in as fresh a condition as possible, and both consumers and fishermen should benefit from this move. The truck will also be used to distribute fish to country towns in New South Wales and lower Queensland.

Papua and New Guinea

Fisheries Development Plan

A development plan for the fishing industry in Papua and New Guinea was approved recently by the Minister of Territories. This plan aims to increase shell production and exports, to reduce import of fish and eventually to export fish. The main points of the plan which will be implemented by the Division of Fisheries of the Territory Department of Agriculture, Stock and Fisheries are:

1. Introduction of improved fishing techniques to native fishermen, including distribution to them of fishing gear,
2. Training of native fishermen ashore and as crews of Administration vessels in all aspects of fishing,
3. Encouragement of indigenous people to organize their activities for increased consumption and trade in fish,
4. Recruitment and training by the Administration of indigenous people as Native Fishery Assistants to assist native fishermen.

It was announced that investigation of potential fishing grounds would be continued. Commercial fishing enterprises by European and native fishermen would be encouraged where they would not conflict with village communities dependent on fishing. A trawler would be acquired by the Administration.

Other objectives of the development plan were the encouragement of fresh water fish production, particularly in inland areas, an increase in oyster production, and investigations to aid the local production of salt for the preservation of fish. As fishing developed, investigations would be carried out on the economic and marketing aspects.

BURMA

New Resident TA Representative for Burma

The UN Technical Assistance Board announced in November 1956 the appointment of Dusan Marusic of Yugoslavia as its Resident Representative in Burma. Mr. Marusic, who succeeds John Wakefield of the United Kingdom, took up his duties in Rangoon in mid-December 1956.

The new Resident Representative was until recently Director of the Economic Assistance Division of the Yugoslav Economic and Technical Assistance Administration in Belgrade. Before that he was Assistant Commercial Attache to the Yugoslav Embassy in Washington, and during this period he served as Secretary to Yugoslavia's delegation to the United Nations General Assembly, and the Economic and Social Council. Mr. Wakefield had occupied his Burma post since early 1953. Before that he represented the Board in Haiti.

CAMBODIA

Fish and Fishery Products Export

The export of fresh fish from Cambodia fell from 8,276 tons in 1954 to 5,043 tons in 1955. During the same period the export of dried fish fell from 9,522 to 4,024 tons while that of fish oils fell from 405 to 104 tons. These declines reflect a general post war trend in exports of fish to traditional markets—Vietnam, Singapore, Hongkong and Indonesia.

CEYLON

Cold Storage Plant

A 500 ton cold storage plant which also includes facilites for quick-freezing fish is nearing completion in Colombo. According to an announcement in the 26 December 1956 issue of Ceylon Newsletter published from Colombo, out of a total of Can. $ 200,000 Canadian Aid under Colombo Plan to Ceylon during 1956/57, $30,000 are earmarked for auxiliary marchinery for this cold storage plant.

Government Assists Fisheries

The Government of Ceylon is constructing houses for the fishermen, as part of its program for improving the standard of living of this community. About 200 houses are nearing completion and another 100 houses are expected to be completed by the end of 1957.

The Government provided funds recently for the establishment of 4 training schools at important fish producing centres. Government officials and fishermen will receive training at these centres for eventually carrying out extension work in fishing villages.

At the Extension Department of the School of Cooperation, Polgolla, inspectors from the Cooperative Department have, over the past two years, been trained for such extension work. Village leaders have also attended training courses periodically at this school.

FRANCE

New Caledonia

Marie Products Industry

Although the waters of New Caledonia abound in marine life, the only marine product which is exported is trochus shells. In spite of the firm price for trochus shells, about 50,000 francs (US $ 785) a ton, in 1955 the amount of trochus shells exported during the year totaled only 723 metric tons as compared to 880 tons in 1954. This decrease was caused by depletion. During

the year an expert of the French Institute of Oceania (Institut Francais d'Oceanie), a scientific research organization with headquarters at Noumea, began studies as to how trochus stocks may be regenerated.

Providing fish for local consumption does not occupy a large number of fishermen and demand for fish was supplemented in 1955 by the importation of canned fish valued at 8,066,000 francs (US $ 126,600). It appears that the fishermen themselves limit the amount of fish caught in order to maintain prices.

A small fish cannery, established in 1951 on the northern tip of the Island, has not been very successful due to the irregular supply of fish.

Tuna Resources Being Studied

A special study of tuna in the waters around New Caledonia is being made by the fishing section of the Institute Francais d'Oceanie. Attention is being given to the possibilities of tuna fishing as a commercial enterprise.

The scientific fishery vessel *Orsom III* of the Institute worked in New Hebrides, with two scientists aboard. The men studied ocean currents, species of fish, and plankton.

For the next international research campaign between 10 August and the end of September, the *Orsom III* was allotted the area including the New Hebrides and Fiji, and extending to the Marshalls.

INDIA

New Shrimp Ground Found

The discovery of a rich new shrimp ground, extending 140 miles along India's Malabar coast, was reported by an FAO/ETAP expert. The discovery, it is claimed, has already led to the start of a shrimp trawling industry and shrimp freezing for domestic and export trade. A private fish processing company has leased a government freezing plant at Calicut and started a domestic and export trade in frozen shrimp.

The FAO/ETAP expert discovered the new shrimp ground while trawling with a 22-foot FAO boat. The shrimp run in a four-mile-wide strip about 140 miles long, average 4 to 5 inches in length, and are being caught at a rate of 100 pounds per hour's trawling with a 10 horsepower open skiff. Use of mechanized boats and extension of the shrimp operations in mid-winter and spring as well as in the summer season, when shrimp are caught in traditional bag nets while schooling on the surface, will vastly increase the catches.

Dried Shrimp Industry Facing Crisis

The century-old shrimp industry of Kerala (Tranvancore-Cochin and Malabar) is facing a crisis as a result of the Government of Burma's complete ban on imports of dried prawns from outside Burma except from the mainland of China, effective 3 July 1956.

For over 80 years Burma has been the chief customer for Kerala's shrimp, consuming about 90 percent of the annual production of about 10,000 metric tons. In recent years, owing to the shifting of Burma's import policy from time to time, placing shrimp on the open general license list at one time and on the restricted license list at another, the fortunes of the Kerala shrimp industry have been fluctuating.

A diversion of Kerala's shrimp to the United States market does not seem possible. The U S. market, which has in the recent past showed keen interest in Indian shrimp, is buying only large size frozen and raw shrimp, while the Burmese market's demand was for ordinary dried small

shrimp. The bulk of the shrimp catch in Kerala belongs to a particular species which does not grow to the size sought by the U.S. market. Shipments of Indian shrimp to America started only in 1955 and the lack of cold storage and other facilities has hindered development.

First Freezer Vessel to Handle Shrimp

The first quick-freezing vessel to operate along the west coast of India arrived in Bombay from the United States. This 115-ton vessel, the *M.V. Judith,* has a quick-freezing capacity of 4 tons a day and additional cold-storage facilities for approximately 70 tons of fish. It has been commissioned by an Indo-American venture.

The vessel will be completely manned by Indian personnel, and will move from port to port along the coast, collecting fish and freezing it on the spot. The main catch will be shrimp. In many cases she will deliver her cargo directly to ocean-going vessels destined for foreign ports, but some will be unloaded at cold-storage plants on shore operated by the company.

New Fish Freezing Plant Proposed

The installation of a quick-freezing plant for preserving fish near Quilon, Travancore-Cochin, India was announced recently by the Director of the Indo-Norwegian Fisheries project at Neendakara. He estimated the total cost of the freezing plant and the ice factory now under construction at Rs. 500,000 (US $ 105,000). The ice factory with a capacity of 25 tons of ice a day is expected to store 300 to 400 tons of fish at a time.

INDONESIA

Marine Research Laboratory

The Indonesian Laboratory of Marine Research has been engaged since 1949 in a program of surface salinity and temperature observations in Southeast Asian waters. The first results of these activities were published by P. Ch. Veen as monthly charts of surface salinity for the period March 1949 to February 1950. J. D. F. Hardenberg and R.E. Soeriaatmadja published similar charts for the period March 1950 to February 1953.

From January 1955 the Laboratory has been publishing regular monthly charts of the surface salinity in the waters of the Indonesian Archipelago, the China Sea and those around the Philippines. The monthly charts distributed by the laboratory to cover the period March 1953 to December 1954 were accompanied by a short description giving the deviations of surface salinity against the average of the corresponding month.

The latest publication by the laboratory described the seasonal fluctuations in the surface salinity of the North Coast of Java, and the 'Subtropical Lower Water' between the Philippines and Irian (New Guinea).

The Eastern Section of the waters is covered, during the East Monsoon, with ocean water of over 34.0‰ salinity and the Western Section with mixed waters of salinity ranging between 31.5‰ and 34.0‰; while during the West Monsoon, the area is covered with mixed water of salinity less than 32.5‰.

The wide range of salinity in these waters is considered to be a result of considerable discharge of fresh water from the many big and small rivers, especially in the rainy season as well as of the inequality in salinity of the ocean waters coming from the East, and the South China Sea water coming from the West, during the dry and wet seasons respectively.

Oceanographic observations taken by the research vessel *Siboela* during 1949 in the Celebes Sea and around Halmahera are compared with those taken by the vessels *Snellius* and *Dana* in 1929. Based on the oxygen content, the 'Subtropical Lower Water' in this region is divided into a Northern and a Southern water type. The regions of origin of these water types are situated in 23°N between 165°E and 165°W and in 15°S between 120° and 150°W respectively. The temperature of the salinity maximum in 1949 was 1.5°C higher and the salinity 0.11‰ lower than in 1949. The salinity maximum lies in about 100 to 200 m. and is closely correlated with the surface currents.

JAPAN

Postwar Recovery of Japanese Fisheries

A large scale recovery of Japan's prewar position and a growing awareness of her stake in international measures for conservation of resources and stabilization of the industry marked the year 1955 in the fisheries of Japan.

The total catch of all Japanese marine fisheries in 1955 was about 5,150,000 metric tons (about 11.3 billion pounds), compared with about 4,650,000 tons in 1954 and 3,500,000 tons in 1938. While the 1955 catch represented an increase of about 10 per cent over the figure for the previous year, there were notable increases and decreases in the catch of individual species. The salmon catch, for example, was about 3 times that for 1954, and the catch of suary pike was up 72 per cent; the herring catch, on the other hand, continued its downward trend and was only about one-third of the 1954 and 15 per cent of the 1952 catch.

Exports from Japan in 1955 of fish and fish products totaled 155,108 metric tons, valued at US $ 75.6 million, an increase of 10 per cent in volume and 2 per cent in value over 1954. Exports of other marine products, including whale oil, pearls, fish oil, agar-agar, shells, dried seaweed, and seed oysters, amounted to 64,680 tons, valued at US $ 30.3 million, which was 2.5 times the 1954 exports in volume and 1.5 times in value. The increase was accounted for almost entirely by shipments of whale oil, which rose from 9,000 to 45,000 tons.

Japanese Tuna Explorations

The newly-built 600-ton tuna fishing "guidance ship", the *Sagami Maru*, sailed from Yokohama in September 1956 to explore the tuna fisheries in the waters of the world outside the Pacific Ocean. Before returning to Yokohama in November 1957 the vessel will operate in the Indian Ocean off the northern tip of Madagascar and around the Seychelles Archipelago, in the vicinity of Mombasa and Zanzibar extending to the vicinity of Eritrea, off the great Westerly swell of Africa confining roughly to the rectangle of sea between 20° and 30° West longitudes and 5° and 15° North latitudes, the Western Atlantic waters just off the estuary of the Amazon extending to 10° North latitude, the Caribbean waters off Brazil as far north as 15° North latitude and finally in the Arabian Sea.

During these operations the vessel will pass through the Suez canal twice and will be the first Japanese fishing vessel ever to use the canal.

Japanese Survey of Brazilian Waters

Japanese fishery research vessel, *Toko Maru*, one of the world's largest vessels of its type, set sail from Tokyo for Rio de Janeiro where she will survey waters off the coast of Brazil to explore the possibilities of tapping undeveloped marine resources. The

Brazilian Government is supporting the project. The four-month survey will collect data on all the various aspects of biological, oceanographic and related subjects.

The *Toko Maru* is a 1,111-gross ton survey vessel of the Fisheries Agency. She was completed in March 1954 and is equipped with two main diesel engines of 300 HP each. She is also equipped with all the necessary equipment for navigation, the latest scientific devices for oceanographic and biological surveys as well as with equipment for fishing and processing of catches. The regular scientific personnel on board will be supplemented by professors from some Japanese universities. The survey will last for 130 days from the middle of December 1956 until late in April 1957.

The research will cover classification, species and size composition of fish as well as plankton. The temperature, colour, degree of water transparency, salinity, oxygen, nitrate and phosphate components will also be checked. Special emphasis will be placed on the catching of bottom fish by means of trawl fishing. Detailed tests will also be made for catching running fish by means of liftnet and longlines.

Security Requirements for Fisheries Loans

To ensure that availble fisheries credit facilities may be easily and readily utilized, the Japanese Government made the security requirements for fisheries loans sufficiently flexible. The security in the form of real estate or other fixed assets is required only in the case of loans to individual fishermen and then only to the extent of 20 per cent of the loans. In other cases, fishing vessel and/or equipment to be acquired provides the main guarantee. This distinction is believed to be made to encourage individual fishermen to join cooperative societies. The feature of particular interest in the Japanese system is the joint liability of the person applying for loan and his associates.

KOREA

UNKRA Trawlers in Action

Fifty eight thousand pounds of fish were caught by four UNKRA-built trawlers working in pairs, in their two first days of operation off the coast of Korea.

The vessels belong to a fleet of ten sister ships owned by the Korean Seven Oceans Fishing Company. They have a gross tonnage of 77.5, an overall length of 75 feet 7 inches, and are equipped with British manufactured Crossley 160 horsepower marine diesel engines capable of a speed of 9 knots.

Built by the United Nations Korean Reconstruction Agency (UNKRA) as part of the Agency's program of assistance for Korea's war paralysed fishing industry, the ships were the first to sail under the United Nations flag. All ten were constructed at a cost of US $ 624,404 at the Cheoy Lee Shipyard, Hong Kong.

After their turnover to the Seven Oceans Fishing Company last August, it was decided to convert four to the single unit otter trawling operations and 6,000,000 kwan has been loaned by the UNKRA Revolving Loan Fund through the ROK/UNKRA Fisheries Control Committee for this purpose. The operation of these boats as single units is expected to be even more efficient in the particular fishing conditions in the Far East.

NETHERLANDS

New Guinea

Exploratory Fishing

On conclusion of the trawling experiments in the waters south of Merauke, the Mekauke Fisheries Staff as well as the fish cutter '*De Goede Hoop*' were changed over to investigations into the pearl oyster fishery in the Geelvink Bay. A fall in pearlshell production from 227 tons in 1955 to 164 tons in 1956, made investigations into the pearl fishery important and urgent.

Development of Native Fisheries

The 1957 reorganized program for the development of native fisheries includes: improvement of indigenous fishing gear, exploration of fishing grounds, and preservation of the catch. This reorganized program goes into operation in May 1957.

Fish Sauce and Pastes Production

Fish sauce and paste were manufactured recently at Merauke in Netherlands New Guinea and on a very small scale at Arama in New Caledonia. The manufacturers hope that it is possible to produce these products in other places of the South Pacific, especially where an Asiatic population would provide a ready market.

The manufacturers also believe that should these fish products prove acceptable to the indigenous peoples in the South Pacific, they would be a nutritionally valuable supplement to their diets based either on rice, bread or starchy roots.

PAKISTAN

Exotic Fishes in East Pakistan Waters

In an article in the *Pakistan Journal of Science*, Vol. VIII, No. 4, 1956, the Director of Fisheries of East Pakistan describes attempts made to introduce suitable exotic fishes in East Pakistan waters. The species tried so far were: *Carassius auratus*, *Trichogaster pectoralis* and *Tilapia mossambica*. Of these only *Tilapia mossambica* showed signs of successfully establishing itself, and is being introduced in other areas. The author recommends further attempts for the introduction of *Trichogaster pectoralis* and *Carassius auratus*, with care being taken to acclimatize the imported fry in laboratory tanks before their release in culture ponds.

Failure of indigenous culturable species, such as *Catla catla* Hamilton, *Labeo rohita* (Hamilton), and *Cirhina mrigala* (Hamilton) to breed in impounded waters, makes the search for species which will breed in such waters a necessity in Pakistan.

Hilsa Fishery

During 1956 West Pakistan produced about 3.7 million pounds of hilsa. Hilsa production in East Pakistan during the same period was estimated at 6.9 million pounds.

It is reported that during 1956 the ascending hilsa could not negotiate the fish ladder in the Ghulam Mohammed Barrage about 150 miles upstream from the mouth of the Indus river. The inability of the fish to ascend to their spawning grounds beyond the barrage will jeopardize the hilsa fishery in West Pakistan.

In implementation of the recommendations of the Indo-Pacific Fisheries Council, detailed investigations are being currently conducted into the hilsa fishery in both Wings of Pakistan.

PHILIPPINES

Bureau of Fisheries Reorganized

The Philippines Bureau of Fisheries was recently reorganized. The Bureau is now composed of five Divisions, namely, Marine Fisheries, Inland Fisheries, Licenses and Regulations, Fisheries Research and Administrative Services. The Division of Investigation and Inspection was abolished and its personnel and function fused with the Division of Licenses and Regulations. The research functions and personnel of the Divisions of Fish Culture and Fisheries Biology, Fisheries Technology and Commercial Fisheries were transferred to the new Division of Fisheries Research. The Division of Marine Fisheries is responsible for functions which relate to commercial development of marine fisheries and aquatic resources. The Division of Inland Fisheries is responsible for the development of inland fisheries and inland fish propagation. The Philippine Institute of Fisheries Technology was transferred to the University of the Philippines, and the seven Regional Schools of Fisheries in the different parts of the Archipelago to the Department of Education. The new position of Assistant Director was created. There is also to be an Advisory Committee on Aquatic Resources with the Director of the Bureau of Fisheries as chairman and a representative each from the fishermen's group, sea products industry, and fish pond operators as members.

Instead of the ten fishery districts there are now eight Regional Fishery Offices. Each Regional Fishery office is headed by a Regional Director who is responsible for all projects and activities in his area and reports directly to the Director of Fisheries or the Assistant Director of Fisheries.

The formal transfer of the Regional Schools of Fisheries to the Department of Education was effected on 12 January and the Philippine Institute of Fisheries Technology to the University of the Philippines on 16 January. The Bureau of Fisheries started to function as reorganized effective 16 January.

THAILAND

Thai Japan Joint Fishing Base

Thailand and Japan have started a joint project to construct a fishing base in Tarutao Island off South Thailand. The Japanese survey ship *Shoyo Maru*, 602 tons, arrived in Bangkok in February 1957 where a survey mission headed by Tahei Iiyama, Chairman of the Japanese Overseas Fisheries Cooperative Association joined the vessel.

The joint venture calls for the construction on Tarutao Island of a fishery base capable of accommodating more than one hundred fishing vessels. The base will include, among others, facilities for refrigeration and canning of fish.

Soon after her arrival in Bangkok the vessel left for Tarutao Island with members of the Survey Mission and Thai Government officials on board.

UNITED KINGDOM

Federation of Malaya

Development of Sea Fisheries Underway

About 40 Japanese fishermen, employed by a Singapore firm, are training Malayan youths in Japanese methods of fishing. Initially candidates are undergoing a two-year course under expert Japanese fishermen whom they are expected to

replace eventually. In the first year the trainees are being taught the theoretical part of the fishing industry and will spend the second year doing practical work at sea. The Singapore Fisheries Department is believed to have approved the plan.

The program of the Chinese firm backing the venture includes, in addition to the development of the deep-sea fisheries, a plan for a shore plant to can and salt fish for local consumption as well as for export.

Other developments include the mechanization of fishing craft with outboard motors. The installation of motors had increased the catch of the boats by 60 per cent, according to the Chief Fishery Officer of Singapore. The Singapore Government has assisted the fishermen in mechanizing their craft with the help of a loan fund of US$ 133,000. At the present there are 550 outboard motors as compared to 100 before establishment of the loan fund. The Fishery Department maintains a mobile unit, consisting of two mechanics, to help service and teach the fishermen how to repair their outboard motors.

Hong Kong

Fishing Activities

During the third quarter of 1956 fishing activities were normal except that large sailing junk trawlers stayed in the harbour to avoid forewarned typhoons.

As compared with the corresponding quarter for 1955, market records showed increases of 11.8 per cent in fresh fish landings, from 126,034 to 140,970 piculs (One picul equals 133 pounds), and 9.9 per cent in salt/dried fish, from 21,203 to 23,306 piculs.

The overall average wholesale price for fresh fish was 14 per cent higher than last year, HK $ 65 per picul as compared with HK $ 57; while that for salt/dried fish was 31 per cent higher, HK $ 46 per picul as against HK $ 35.

Shrimp Grouuds Overfished

The activities of the greatly expanded fleet of mechanized shrimp trawlers have resulted in over-fishing the existing shrimp grounds. Although during the period under review the areas of operations were extended, both to the East and West, catches per boat were still low. Many of the bigger shrimp boats switched to fish collecting while others stopped fishing altogether and the crews devoted their time to preparing gill nets for the Yellow Croaker season.

Experimental Fishing

During July-September 1956, the F.R.V. *Alister Hardy* continued to trawl over rough grounds, which local trawlers with their light gear are unable to fish. In cooperation with the Fisheries Research Unit of the University of Hongkong, the Fisheries Division of the Department of Agriculture, Fisheries and Forestry employed *Alister Hardy* for shark longlining. An inshore otter trawl, nylon trammel nets and a shark longline, were fished from the Division's 30-ft boat *Olenka*.

Training of Fishermen

During the third quarter of 1956, four candidates qualified as skippers, 34 as coxswains and 4 as engineers. In addition, 6 candidates were examined for the "Acting Trawler Master (Limited)" endorsement.

Mechanization of Fishing Craft

A total of 156 vessels were mechanized during the quarter July-September 1956: 63 longliners and 13 hand liners 36 purse seiners; 34 trawlers; 5 Pateng (three masted junks of 50 feet length); 3 fish

collectors; and 2 gill netters. After allowing for the disappearance of 18 former mechanized vessels which reverted to sail and for 2 which were transferred to the Motor Trading register, the strength of the mechanized fleet as at 30 September 1956 stood at 1,204 vessels.

Fish Fry Trade

The ban imposed early in 1956 by the Kwangtung Provincial Government on the exportation of the fry of the Big Head, Silver and Grass Carp continued without relaxation. The fry of the less popular Mud Carp and Bream were free from export restrictions. Considerable quantities of these two varieties had to be imported for stocking the New Territories ponds.

The Hong Kong fish fry exporters were able, with great difficulty, to obtain small quantities of Big Head, Silver and Grass Carp fry from Kwangsi Province for consignment to Formosa and Singapore. The percentage mortality among these fry was exceedingly high, the fish having taken 3 to 5 days to reach Hong Kong after leaving the nurseries. Many orders received in Hong Kong from importers in Bangkok, Tokyo, and Manila for these three varieties could not be fulfilled.

Oyster Culture

Recent experiments in Deep Bay by the Department of Agriculture, Fisheries and Forestry, indicated that the oysters spawned in July and by the end of September the spat averaged between 1-1½ inches in diameter. The 1 year old oysters collected in June and July 1955 continued to do well, reaching an average of 3 inches in diameter by the end of September.

The 1 year old oysters transferred from Deep Bay to Centre Island, Tolo Harbour, in December 1955, grew at approximately the same rate as those in Deep Bay. It is considered by the Department that it should be possible to introduce an edible oyster industry to this new area.

Deep Bay oysters transferred to Tolo Harbour were able to stand the change in environment but it was not known whether or not they would reproduce. Instead of waiting until the young oysters reached maturity, ripe adult Deep Bay oysters were transplanted. Spawning took place and spat settled thickly on the empty shells provided. In three months the young oysters were between ½-2 inches in diameter.

Fish Marketing Organization

The quantity of fish handled by the Fish Mraketing Organization increased from 30,115.1 tons in 1951 to 40,333.3 tons in 1955. During the same period the average wholesale prices, in HK cents per catty (1.33 pounds), of fresh and salt fish sold at the markets of the Organization came down from 82 and 65 respectively in 1951 to 56 and 43 respectively in 1955. This reduction in prices is, in the main, a result of the elimination of middlemen's profit.

The revolving loan fund set up by the Fish Marketing Organization in 1946, to provide credit for productive purposes to local fishermen, had by 1955 provided 2,643 loans, amounting to HK $ 2,533,944 of which $ 1,996,871 has already been repaid.

In the Organization's welfare program, education continues to play a major part. Over 1,350 fishermen's children are receiving education at schools wholly or partially financed by the Organization.

North Borneo

Inland Fisheries in North Borneo

The total production of fresh fish from fish ponds in North Borneo is estimated to be in the neighbourhood of 10 tons for the year 1956. About 90 percent of this yield consists of Tilapia, and the remaining 10

percent of Chinese Carp *(Cyprinus carpio, Ctenopharyngodon idellus* and *Hypophthalmichthys molitrix)* with a very small proportion of Gorami *(Osphronemus goramy)*. No data is available for production in rivers and lakes.

The total area of fish ponds in August 1956 was approximately 30 acres. The majority of these ponds are concentrated in inland districts. The area of culturable inland waters in North Borneo as yet remains to be investigated. The stocking of Tilapia in the Benoni Swamp in Papar District, which was carried out in 1953, has to date given very promising results. The Tilapia have taken the place of the local fish *(Puntius, Osteochilus, Trichogaster trichopterus* and *Anabas testudineus)* which were the major species in the catches before and were of little commercial value, whereas the Tilapia has been accepted as first class fish in the local market.

SINGAPORE

Brackish Water Ponds

During 1955, the total catch of fish, prawns and crabs from the two experimental brackish water prawn ponds built in 1954 at a cost of M$ 12,840 amounted to 8,614 Katties (One Katty equals 1.33 pounds) and realised $ 8,194 as compared with 1,035 Katties and $ 1,873 for the last three months of 1954. The above data are considered to indicate that a small family would be able to operate such ponds on an economic basis provided capital was available for building bunds and gates.

Fisheries Loans Fund

The Fisheries Loans Fund (initially M$ 400,000) continued its operations during 1955. Only one application was received and no loan was granted. Repayments amounted to $ 97,302.64; interest collected was $ 4,272.34. The balance of Fund at the end of the year including interest collected stood at $ 416,343.38.

Fisheries Mobile Unit

The Fisheries Mobile Unit continued during 1955 its instruction and demonstrations to fishermen in the repair and maintenance of their fishing boat engines. Spares valued at M$ 290 were sold to the fishermen at wholesale prices thus saving them the expense of obtaining their supplies from the city.

UNITED STATES OF AMERICA

Hawaii

Fisheries Exploratory Research

Three research vessels of the Pacific Oceanic Fishery Investigations (POFI) of the U.S. Fish and Wildlife Service, Honolulu, are operating south of the Equator in the vicinity of the Marquesas, Tuamotu, aud Society Islands. The *HUGH M. SMITH* is conducting hydrographic and productivity studies between 110° W. and 150° W. longitudes. The *JOHN R. MANNING* is longlining for deep-swimming tuna and reports only mediocre catches along 132° W. longitude but excellent catches near the Marquesas Islands. The *CHARLES H. GILBERT* is conducting surface fishing for yellowfin and skipjack, using Marquesan sardines as baitfish. Although the schools are wild and difficult to chum, several goop skipjack catches were made and several hundred fish tagged with plastic-tube tags. All three ships are due to return to Honolulu in March 1957.

Monthly Surface Temperature

Monthly surface temperature records for the years 1950 through 1956 were studied from observations taken by Pacific Oceanic Fishery Investigations (POFI) of the US Fish and Wildlife Service, in the central equatorial Pacific, and off the coasts of Japan, southwestern Canada, California, Panama, and Peru. Preliminary analysis of these data suggests that during 1950 the surface temperatures over the major portion of the North Pacific were comparatively cool; warming occured during 1951 through 1953, and cooling occurred during 1955 and 1956. In late 1956 there was again an upward trend toward warmer surface temperatures.

Skipjack Research

During the last quarter of 1956, one comprehensive and one monitoring survey were completed in the Oahu environmental area by the POFI vessels. Three monitoring surveys were completed in the same area by the Territorial Division of Fish and Game vessel *Makua*.

One tagged skipjack was recovered on 4 October 1956, 109 days after release, some 22 miles from the tagging site. This was the only recovery from 48 skipjacks tagged with the type D-1 all-plastic dart tag. There was no apparent growth, judging from the size of the recovered fish in comparison with the average size of the school from which the fish was tagged.

Preliminary tabulation was started as part of a project to compute catch-per-unit effort in the skipjack fishery during 1956. On the basis of incomplete returns, skipjack landings for January through September 1956 were estimated at 9,219,000 pounds.

Albacore Research

Data available indicate that (1) the deep-swimming albacore are found uniformly distributed within a broad range of temperature, roughly 47° to 64°F and (2) that there does not seem to be any specific temperature preference according to size. Surface-swimming albacore also have a similar range, 52° to 66°F. At the central portion of this range, physical and biological phenomena apparently are favourable for higher biological productivity.

Studies have shown that the age of the Hawaiian Island and central North Pacific albacore cannot be determined by the vertebral method. The first prerequisite in the use of vertebrae for age determination, the duplication of ring counts, cannot be met.

Observations by POFI indicate that the minimum size of spawning albacore is about 90 cm. (33 pounds), that the spawning season is protracted, and that some fish spawn at or near the Hawaiian Islands during the summer months.

Interesting Tag Recovery

A troll-caught yellowfin, tagged and released on 8 October 1955, was taken by a Japanese longliner on 10 November 1956, about 700 miles to the east of the point of release. The fish, which had been out for 13 months, grew from 55 to 95 pounds. It is significant that the fish, originally caught as a surface-schooling yellowfin near the Island, was recaptured as a deep-swimming fish in the open sea.

Baitfish Research Coordinating Committee

During December 1956, a Baitfish Research Coordinating Committee (Dr. Albert L. Tester, Director of POFI, Chairman) was formed in Honolulu to coordinate current research aimed at augmenting the baitfish supply by various means, such as research on indigenous species, introduction of exotic species and pond culture of tilapia. It has already been demonstrated by sea trials that tilapia is hardy enough to stand very rough sea conditions while being transported in the bait tanks of fishing vessels and that tilapia smaller than 3 inches in length will attract skipjack to the stern of a fishing vessel.

VIETNAM

Canned Sardine

Domestic production of canned sardines in Vietnam is carried on by one small plant having a daily capacity of 8,000 cans (12 1/3 oz). The output of this plant from the beginning of operations in January 1956 to mid-July consisted of 92,000 cans of pilchards in tamato sauce, or only about 35 metric tons (nett weight). The factory has recently received additional equipment for handling cans of 122 grams (4½ oz.), which is the most popular size in that country.

The low volume of canned fish production is explained by the preference of the indigenous population for fresh fish, as well as for dried and, more recently, smoked fish.

Before 1956, consumption of canned sardines in Vietnam was satisfied entirely by imports. In the first half of this year domestic production contributed about 12 per cent of the greatly reduced supply.

Consumption of sardines in Vietnam has been declining rapidly, and a further decline appears most likely. This development is due to the withdrawal of the French Army and of a large portion of the French civilian population, which had been the chief consumers of sardines.

FAO Activities

FAO Fisheries Activities in the Indo-Pacific Region during 1956

To gain a closer insight into the composition and extent of the accessible resources, and at the same time to encourage closer intergovernmental cooperation in the planning and execution of research investigation, the Fisheries Division of FAO drew up in 1956, a program for a world survey of living aquatic resources. This survey is of special importance to the Indo-Pacific region, and assurances have been received from governments in the region of their cooperation in the assembling and exchange of information. FAO also conducted a meeting of inland fisheries experts in Helsinki in July 1956 and presented a review of the importance of inland fisheries in world food economy—a matter of particular significance for this region.

To raise the efficiency of fishermen in the region, FAO has throughout 1956 engaged master fishermen to demonstrate modern fishing equipments and techniques in India, Philippines and Ceylon. Two naval architects were assigned in India in 1956 to advise on boat design and construction. A team of two harbour engineers is advising the Government of India on location and construction of new fishing harbours. This development may lead to a greater concentration of fishing operations and landings, a matter of great economic importance to the industry. FAO has also assisted in setting up facilities for training in marine fishing methods in India, where an expert helped organize a series of courses at selected marine fishing centres, and in Noumea where, jointly with the South Pacific Commission, a three months training centre was conducted for the territories

covered by the Commission. During 1956 a marine fisheries biologist was assigned to the Philippines to assist in the evaluation of accessible fish stocks, especially Tuna, while FAO Inland Fisheries specialists were assigned to Ceylon and Burma in order to encourage more efficient production from the inland waters.

FAO continued to urge government attention to the problem of distribution and marketing of fish, a highly perishable food, in the adverse climatic conditions of the region. A survey of the respective roles of the middlemen and cooperative organizations in fisheries industries was begun in 1956 in association with the Universities of Malaya, Bombay and Hong Kong. FAO fish marketing specialists surveyed fish marketing in India and have made proposals for the introduction of pilot fish marketing schemes at selected centres. An FAO fish processing specialist was assigned to Thailand to work through 1956 onwards. The problem of fish preservation and processing under tropical and sub-tropical conditions received special consideration at an international meeting of fish-processing experts conducted by FAO in the Netherlands in June 1956.

Through the quarterly publication of *FAO Fisheries Bulletins* and the *FAO Fisheries Abstracts*, fisheries workers were kept in touch with recent developments, covering the technical aspects of fishing and fish trade.

FAO Yearbook of Fisheries Statistics

The world catch of fish has risen by more than 40 per cent since 1948, from about 19,400,000 to about 27,700,000 metric tons in 1955, according to the latest edition of the *FAO Yearbook of Fishery Statistics (Vol. V—Production and Fishing Craft)*. This edition of the *FAO Yearbook* includes fisheries statistics from more than 150 countries and territories, given in 72 tables, important summary data being shown in diagrammatic form. Detailed tables are given for 73 selected countries which land about 75 per cent of the world catch. Fiva new tables show: i) the world catch dne landings by countries arranged by region, ii) catch and landings in quantity by group of species and by countries, iii) a summary of production of preserved and processed commodities by selected countries, and iv) catch of whales by whaling areas and countries.

The statistics reflect the remarkable recovery of the world's fishing industry since the war, with Japan firmly in the lead of fishing nations. The quantity of fish landings by the Japanese fishing fleet grew from 2,430,000 in 1948 to 4,720,000 metric tons in 1955, over 2,000,000 tons more than the second biggest fishing nation, the United States which, including Alaska, landed 2,687,000 metric tons in 1955. USSR with a production of 2,500,000 metric tons (excluding aquatic mammals) is the world's third largest fish producer. China (mainland) is the fourth biggest fishing nation with an estimated 2,000,000 metric tons in 1955. Other fishing nations catching more than 1,000,000 metric tons annually are Norway (1,867,000) and the United Kingdom (1,099,700).

Outstanding increases in fish production are recorded for Africa, Asia and South America and Europe. The total African catch rose from 440,000 tons in 1938 to 1,620,000 tons in 1955. Over the same period production in Asia shows an increase in tonnage from 9,350,000 to 11,280,000; while the European production increased from 5,540,000 to 7,650,000 tons.

Production figures recorded for some of the countries in the Indo-Pacific region are: India—744,000 metric tons (1952) and 839,000 (1955); Indonesia—472,000 metric tons (1938) and 651,500 (1955); Pakistan—243,000 (1952) and 270,900 metric tons (1955); Thailand — 161,100 (1938) and 213,000 (1955). There has been a particularly striking increase in fish production in the Philippines, from 80,900 in 1938 to 385,300 metric tons in 1955, (excluding mollusks used for duck feed). Both Aus-

tralia and New Zealand have increased their fish production; Australia from 33,500 (1938) to 52,100 (1955) and New Zealand from 27,000 to 39,200 metric tons over the same period.

Herrings, sardines, anchovies, menhaden, etc. make up the largest group, yielding 7,000,000 metric tons a year of 27 per cent of the total production, while the group made up of cods, hakes, haddocks, etc., yields 4,200,000 metric tons or 16 per cent. Fresh water fish account for 2,600,000 metric tons (10 per cent) and mollusks for 2,500,000 (9 per cent). Tunas, bonitos and mackerels account for 1,700,000 metric tons (6 per cent).

The text throughout is printed in English and French, with the Introduction, Notes and Section titles also in Spanish. Notes and glossaries of English, French and scientific names of fish provide interesing and valuable background and explanatory information.

FAO Advice on Fishery Vessels

Interest of Governments in the proper designing and construction of fishery research vessels is becoming more and more marked and the advice of FAO on the subject is being sought with greater frequency. Able to draw on the experience of all countries which have built and operated fishery research vessels, FAO can analyse and asssess the requirements for such vessels, and advise objectively on their design and construction.

Recently the Chief of FAO's Fish Boat Section of Fisheries Division visited the Union of South Africa to advise the Government on the design of fishery research vessels. Similar advice has also been given to the Government of Portugal. Previously the Governments of Sweden and Pakistan were among those who benefited by such advice.

FAO/ETAP Naval Architects have during the past few years been engaged in India in designing suitable fishing vessels which will fit in with the program of mechanization of fishing vessels in that country. Ceylon also has been receiving such assistance. The majority of the countries in the Indo-Pacific region have under implementation, plans for the mechanization of their fishing fleet. They may significantly benefit by seeking FAO advice and thus by drawing on the experience of naval architects and boat builders throughout the world.

International Fishing Gear Congress

FAO has issued invitations to 74 member countries and various international fishery organizations, to send representatives to the First International Fishing Gear Congress which will be held in Hamburg, Germany, 7–12 October 1957, at the invitation of the Government of the German Federal Republic (See *Curr. Affrs. Bull., No. 17, p. 20*).

The Congress has already invoked world wide interest, the response from the fishing industry itself being particularly marked. The Governments of Holland, Japan and Germany have already formed Liaison Committees to coordinate the participation of scientists and other interested parties. Other countries are likely to take similar measures.

The Congress will cover all important aspects of fishing gear and accessory equipment. Many kinds of fishing gear and materials, navigation aids, labour saving and labour aiding machinery for net and gear making and for handling gear aboard ships will be on display.

While representatives of Governments particularly interested in fisheries will be participating, FAO is expecting that the majority of delegates attending and technical papers presented, will come from various scientific institutions and the fishing industry.

Fishery Training Centre

By gracious invitation of the Government of Australia, the FAO/ETAP Training Centre in Fisheries Administration, including Statistics, Cooperatives, Marketing and Fishery Economics will be held in December 1957/January 1958 in Sydney, Australia. The holding of such a Training Centre was recommended by IPFC at its 6th Session held in Tokyo from 30 September to 14 October 1955. The details of curriculum, instructors, demonstrators, field trip as well as physical facilities of accommodation etc. are being worked out by FAO and the Government of Australia.

FAO Technical Assistance

Fishing Gear Expert for India

Dr. Miyamoto (Japan), FAO/ETAP Fishing Gear Technologist, has arrived in India on his 12-month assignment. His duties are "to advise and assist the Government in planning and implementing a program of research on fishing gear".

For ten years from 1935 Dr. Miyamoto was Assistant Professor at the Imperial Fisheries Institute, Tokyo, training students in fishing technology and experimental research. From 1945 onwards he has been the Chief Technologist, Fishing Gear Division, Tokai Regional Fisheries Research Laboratory. Dr. Miyamoto has published various papers on fishing gear. He has made exploratory surveys in the Bering Sea to study the salmon and crab fisheries and has visited countries in Southeast Asia to study tuna longlining, trawl fishing and oceanography in the area. Dr. Miyamoto has also been very actively connected with the IPFC.

Fishing Gear Expert

Mr. Tsutomo Ishiro (Japan), FAO/ETAP Fishing Fleet Manager, has arrived in West Bengal, India on his 12-month assignment. Mr. Ishiro "will advise and assist the Government of West Bengal on the management of that Government's fleet of fishing craft, including the direction and day-to-day operation of the fleet, the continuous maintenance of the boats, the management of the cold storage and ice-manufacturing plant, the discharge of catches, auction sales, office management and correspondence".

Mr. Ishiro studied management of fisheries, navigation seamanship at the Imperial Fisheries Institute in Tokyo. Mr. Ishiro has wide experience in the administration of fishing fleets both in Japan and in Vietnam.

Fishing Fleet Manager for India

Mr. George McKenzie (Scotland), FAO/ETAP Specialist, recently took up his 12-month assignment in India as Fishing Fleet Manager (Deep Sea Fishing Station, Bombay).

His duties are "to advise and assist the Central Government on the management of the Pilot Deep Sea Fishing Station in Bombay, including the direction and day-to-day operation of the fleet of fishing boats under the jurisdiction of the Station, the continuous maintenance of the boats, the management of cold storage and ice-manufacturing plant, the discharge of catches, auction sales, office mangement and correspondence".

Starting as an apprentice, rigging ships and making nets in the firm of William

McKenzie and Sons, Aberdeen, Mr. McKenzie rose to become a partner in the firm in 1936 and a Director in 1941. For the past ten years, as part owner in five trawlers, he has made fishing trips to all the different areas at various seasons of the year, in order to study the best types of nets, floats, kites, bobbins and other equipment. He has studied gear materials and their manufacture from raw materials to the finished article.

Fishery Engineer for India

Mr. Skapti Jonsson (Iceland), FAO/ETAP Specialist, recently took up his 12-month assignment as Fishery Engineer in Saurashtra, India.

His duties are "to assist the Government in planning and implementing a program for the expansion and improvement of marine fish production, with particular regard to the use of small fishing craft, through such measures as: (a) the improvement of existing indigenous craft and gear; (b) the development of local craft and the introduction of gear of foreign design; and (c) the training of local fishermen in the use of such gear as referred to above."

Mr. Jonsson has worked as deck-hand, engine operator and skipper on small, medium and large-sized fishing boats, using longlines, driftnets, purse seine, bottomset gillnets, Danish seine and trawl. He has worked on large modern steam trawlers as mate and captain, fishing off Iceland, the United Kingdom, Germany and Denmark. In addition to his native tongue Mr. Jonsson speaks English, Danish and Norwegian.

Fishery Biologist for Indonesia

Mr. T.H. Butler (Canada), FAO/ETAP Marine Fishery Biologist, arrived in Indonesia in February 1956 on his 12 month assignment. His terms of reference are: "to advise and assist the Government in planning and carrying out a survey to locate the marine grounds occupied by shrimps in Indonesian waters and to assess the magnitude of the stocks on those ground".

Mr. Butler attended the University of British Columbia, Vancouver, obtaining his MA (1953) in Zoology. As Assistant Scientist and Investigator-in-Charge at the Pacific Biological Station of the Fisheries Research Board of Canada, he studied the crustacean resources of British Columbia. Mr. Butler has written a number of technical and scientific papers and reports on his investigations.

Fishery Technologist for Pakistan

Mr. Christen Eriksen, (Norway), FAO/ETAP Fishery Technologist, has been assigned to Pakistan for a period of twelve months. His duties in Pakistan will be "to carry out an economic reconnaissance survey of the fisheries of the Mekran Coast, with a view to identifying the factors hampering fishery development, and to make recommendations regarding steps to be taken to organize the fishery industry there on a sounder basis. Special attention is to be paid to cooperative forms of organization and to problems of marketing."

Prior to his present assignment Mr. Eriksen was on a short-term assignment in Jordan as a Fishery Technologist.

IPFC News

7th IPFC Session, Bandung, Indonesia

On the kind invitation of the Government of the Republic of Indonesia arrangements have been completed to hold the 7th Session of the IPFC at Bandung, Indonesia from 13-27 May 1957. Invitations have been issued to the 16 Member Governments of the Council and to a number of scientific institutions and organizations, including

...oming Session include the tuna ...ies of the Pacific Ocean, the culture of ... in...rine fields, the developments of ...

...r the Council's Session and facilities are being provided for an extended post-sessional study tour for those delegates desiring to participate.

...th Executive Committee Meeting

The Executive Committee of the ...uncil held its 24th Meeting at the FAO Regional Office for Asia and the Far East, ...ngkok, from 12-15 March 1957 under the ...ce chairmanship of Dr. N.K. Panikkar ...

The Committee dealt with general business relating to the Council's activities and completed arrangements and documentation for the 7th Session of the Council. The Meeting was attended by Nai Boon Indrambarya (Thailand) and in the absence of Dr. D.J. Rochford (Australia), by Dr. M.R. Qureshi (Pakistan), Chairman of Technical Committee II of the IPFC. Mr. J.A. Tubb, Regional Fisheries Officer served as Secretary with the assistance of Dr. M.R. Khan, Assistant Regional Fisheries Officer and Miss A. Jiannee, Technical Assistant.

Correction

IPFC Secretariat regrets an error in *Current Affairs Bulletin, No. 17*, in designating the delegation for the United Kingdom Government to the Rastrelliger Sub-Committee Meeting held in Penang 24-30 September 1956, as being for the Federation of Malaya. The delegation consisted of Mr. D.W. Le Mare, Mr. Soong Min Kow and Dr. Tham Ah Kow; Mr. D.M.F. Hall and Dr. G.R. Fish did not attend.

New Publications

Directory of Fisheries Institutions

"Directory of Fisheries Institutions in Asia and the Far East" was published and distributed in February 1957 by Indo-Pacific Fisheries Council. The Directory furnishes an up-to-date survey of the facilities within the region for carrying out research and developmental work in fisheries. National Institutions of 19 countries in the region as well as the International Organisations within the region are listed.

... on Fishes of Japan

Recently published "Fishes of Japan" ... Ltd., Tokyo, Japan, 1955 describes and illustrates 391 species of fish from Japanese ... gives information on distribution, ecology, life history, method of capture and utilization of the various species, also includes a list of the scientific, Japanese and English names of the fish. The book is priced at US $10.00.

New Publications from Taiwan

Volume 1, No. 1 of the Report of the Institute of Fisheries Biology of the Ministry of Economic Affairs, Taiwan and National University, was published in November ... The 67 pages report contains 4

"Bibliography of Scientific Publications of South and Southeast Asia", Vol. 2, No. 1, was issued in April 1956. The bibliography, issued quarterly, is compiled by the UNESCO Science Cooperation Offices for South and Southeast Asia and is published by INSDOC. Copies, priced at Rs 10/– postpaid, may be ordered from INSDOC, National Physical Laboratory, Hillside Road, New Delhi, India.

Personalia

Dr. Finn Visits Latin America

Dr. D.B. Finn, Director of Fisheries Division of FAO, left Rome in November to attend the FAO Latin America Regional Conference in Santiago, Chile from 19—30 November 1956 and introduced the item "Use of General Fisheries Surveys in Economic Planning", and took part in the discussions that followed.

Dr. Finn later toured Agentina, Brazil Chile, Columbia, Mexico, Uruguay and Venezuela where he held discussions with fishery administrators. On his way back Dr. Finn held similar discussions with fishery officers on the Pacific Coasts of U.S.A. and Canada.

Mr. Olsen surveys FAO/ETAP Country Program in Far East

Mr Karl Olsen, Chief of the Field Liaison Service of FAO, after attending the Far East FAO Regional Conference in Bandung, made a series of visits to field missions in Pakistan, Ceylon, Indonesia, Thailand, Burma, India and Afghanistan. Mr. Olsen is preparing a series of recommendations on country programming, relations with the TAB Resident Representatives and the administrative servicing of field missions, as well as observations on the technical servicing and supervision of field activities. He considers that, with some exceptions, the field program is going well and said that on more than one occasion government officials had gone out of their way to commend the work that is being done. Mr. Olsen hoped that the field liaison service would be able shortly to lend the full aid and support that field missions urgently need from Headquarters.

Dr Hampton visits Near and Far East

Dr. W. F. Hampton, Chief of Fish Processing Section, FAO Fisheries Division, visited Khartoum, (Sudan) and Entebbe (Uganda) where he discussed with local fisheries authorities problems of fish processing, especially salting and drying. From Africa Dr. Hampton proceeded to Ceylon and Thailand to hold similar discussions with fisheries officers and FAO experts. On his way back to Headquarters in December 1956 Dr Hampton also visited India and Pakistan.

Mr. Kristjonsson visits Far East

Mr. Hilmar Kristjonsson, Chief of Fishing Gear Section, FAO Fisheries Division, visited Japan and held discussions with gear technologist and fisheries officers, particularly in connection with the FAO Fishing Gear Congress to be held in Hamburg. Mr Kristjonsson found great

interest in Japan for this Great Congress. There were indications that some 30 papers may be be submitted to the Congress by Japanese experts. From Japan Mr. Kristjonsson went to Manila, Philippines, where he had discussions with FAO/ETAP experts regarding the progress of their work. From Manila he then proceeded to Noumea, New Caledonia where he acted as Associate Director of the South Pacific Fisheries Training Course from 19 30 November 1956. Mr. Kristjonsson returned to Rome in December 1956.

Dr. Anton F. Bruun visits Far East

On behalf of the UNESCO Science Cooperation Office, Dr. Anton F. Bruun visited the Philippines, Hong Kong, Vietnam, Malaya, Singapore, Indonesia and Thailand in November-December 1956 to make a survey of existing marine science institutions, to advise on their present and future research program, and to explore the possibilities for regional coordination of similar projects.

While in Bangkok, Dr. Bruun gave a talk at the Zoology Department of the Chulalongkorn University on "Life in the Deep Seas". The talk which was extremely illuminating and informative, was followed by showing of films taken during the *Galathea Expedition*. These films concerned the techniques and equipment employed to study life in the deep seas and the types of life that were found to exist there.

New Duties for Dr. Tester

Dr. Albert L. Tester, Director of Pacific Oceanic Fisheries Investigations, and Administrative Correspondent of IPFC for U.S.A., was appointed Chairman of Baitfish Research Coordinating Committee formed in Honolulu during December 1956.

Thai Officers discuss Hydrography with POFI

Rear Admiral V. Desakorn, Commodore S. Mahakita, and Lt. Comdr. S. Aksharanugraha of the Hydrographic Department, Royal Thai Navy, visited the Pacific Oceanic Fishery Investigations offices in Honolulu on 7 February 1957 to discuss methods of conducting a hydrographic and fisheries survery of the Gulf of Thailand during this coming summer. They departed for Scripps Institution of Oceanography on 9 February on the next leg of a round-the-world trip, during which they will visit all major hydrographic institutions.

UNESCO Fellowship for Philippine Fishery Workers

Mr. Demetrio M. Gracia of the Bureau of Fisheries, Mr. Amadeo S. Timbol, now of the Nasugbu School of Fisheries, and Miss Prudencia V. Conlu of the Philippine Institute of Fisheries Technology were recently granted fellowships by the UNESCO Southeast Asia Science Cooperation Office to attend the Regional Training Course in Marine Taxonomy and Planktonology which was held in Nha Trang, Vietnam from 11 February till 9 March this year. Mr. Gracia took up Planktonology, and Miss Conlu and Mr. Timbol Marine Taxonomy.

Indonesian Trained in Philippines

Mr. Sukandi, Indonesian trainee in fisheries education under the auspices of the ICA, Djakarta, was in Manila from April to December 1956. He received a well-rounded training in the different phases of applied fisheries work and was given the opportunity of observing all the activities in the technical divisions, experimental and demonstration stations of the Bureau of Fisheries, and methods of instruction in the

Philippine Institute of Fisheries Technology and the two regional fisheries schools in the island of Luzon. He returned to Indonesia on 21 December.

Burmese Fisheries Student Graduates

Maung Boon Swee left Manila for Rangoon on 4 January. A government scholar from Burma, he was sent to the Philippines in July 1954 to take up the course in fish culture at the Philippine Institute of Fisheries Technology, and was among the several students who graduated with honors in the class of 1956 during the graduation exercises held last 26 November. Mg. Boon Swee graduated *in absentia* having left for Japan in September, to pursue further studies in fish culture. He returned to Manila in December to make a report of his observations to the Superintendent of the Institute.

Conferences, Meetings and Courses

* *March - December 1957*

February	11/	UNESCO Regional Training Course in	NhaTrang, Vietnam
March	9	Marine Taxonomy and Planktonology	
,,	4	Conference in Biophysical Research	Columbus, U.S.A.
,,	20	Baltic Hydrographic Meeting	Helsinki
,,	31	Inter-Island Marine Biological Conference	Porto Rico
May	7	International Hydrographic Bureau - 7th Congress	Monte Carlo
,,	13	Indo - Pacific Fisheries Council - 7th Session	Bandung
,,	14	Permanent Commission of the International Fisheries Convention (1946)	Lonbon
,,	20	International Commission for the Northwest Atlantic Fisheries (ICNAF) - 7th Anuual Meeting	Lisbon
,,	20	Baltic and International Maritime Conference	Paris
,,	–	Caribbean Commission - 7th Session of the West Indian Conference	
,,	27/	Workshop on Population Dynamics and the Selectivity	Lisbon
June	3	of Fishing Gear (Joint ICNAF/ICES/FAO)	
,,	1	South Pacific Commission-8th Meeting of the Research Council	Noumea
,,	1	Congress of International Committee on Photobiology	Turin
,,	24	International Whaling Commission-9th Annual Meeting	London
,,	–	International Internal Combustion Engine Congress	Zurich
June (for six months)		UNESCO Training Course in Marine Biology, Planktonology, and Ichthyology	Havana, Cuba

July	8	International Navigatian Congress-19th Session	London
,,	–	Special Committee on Oceanic Research - 2nd Session	–
August	8	International Statistical Institute - 30th Meeting	Stockholm
,,	28	International Congress on Cell Biology - 9th Session	St. Andrew's, Scotland
,,	–	British Assocsation for the Advancement of Science	Dublin
September	3	International Union of Geodesy and Geophysics - 11th General Assembly	Toronto
,,	11	American Fisheries Society - 87th Annual Meeting	Las Vegas, U.S.A.
,,	15	International Congress on Ship Hydrodynamics	Madrid
,,	27	International Fisheries Trade - 2nd Fair	Copenhagen
,,	27	Symposium on Techniques of Measuring Basic Marine Production (joint ICES/UNESCO/FAO)	Bergen
,,	30	International Council for the Exploration of the Sea - 45th Meeting	Bergen
,,	–	American Society of Limmology and Oceanography - Special Meeting	Woods Hole, U.S.A.
October	7	International Fishing Gear Congress (FAO)	Hamburg
,,	20	Pan Indian Ocean Science Congress - 3rd Session	Tananarive, Madagascar
,,	21	International Fisheries Exhibition	Lowestoft
November	2	FAO Conference - 9th Session	Rome
,,	11	Gulf and Caribbean Fisheries Institute - 10th Annual Meeting	Miami Beach, U.S.A.
,,	18	Pacific Science Congress - 9th Session	Bangkok
,,	–	International Advisory Committee on Marine Sciences - 2nd Meeting	,,
,,	–	Caribbean Fisheries Seminar - 3rd Seminar	–
,,	–	Regional Conference on Sea Fisheries (CCTA)	Western Africa
End year		Meetiug of Marine Biologists and Oceanographers (IFAN)	Lobito, Angola

FAO Training Centres

October 21/ December 14	Latin American Fish Processing Training Centre	Lima
December 16/ January 25	Training Centre on Fishery Cooperatives and Administration for the Indo-Pacific Region	Sydney

*** Note :** All dates are subject to revision.

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